

What Is Claimed Is:

1. A receptor-ligand complex comprising a receptor component containing GPCR135 or an active fragment of GPCR135 bound to a ligand component containing relaxin3 or an active fragment of relaxin3, wherein at least one of the receptor and ligand components is in a substantially pure form.

2. The receptor-ligand complex of claim 1, wherein the receptor component is originated from a human, a mouse, or a rat, and the ligand component is originated from a human, a mouse, or a rat.

3. The receptor-ligand complex of claim 1, wherein said ligand component bears an ¹²⁵I radioisotope label.

4. The receptor-ligand complex of claim 1, wherein the GPCR135 has an amino acid sequence selected from SEQ ID NO: 12, SEQ ID NO: 13, and SEQ ID NO: 15.

5. The receptor-ligand complex of claim 1, wherein said GPCR135 component is a product of expression on the cell surface of a recombinant GPCR135 host cell.

6. The receptor-ligand complex of claim 1, wherein said receptor component contains the GPCR135 or active fragment of GPCR135 associated with isolated cell membranes or lipid vesicles.

7. The receptor-ligand complex of claim 1, wherein both said receptor component and said ligand component are in a substantially pure form.

8. The receptor-ligand complex of claim 1, wherein said ligand component is in a substantially pure form as a product of recombinant expression.

9. The receptor-ligand complex of claim 1, wherein said at least one of the receptor and ligand components is in a substantially pure form as a product of isolation, peptide synthesis, or recombinant expression.

10. The receptor-ligand complex of claim 1, wherein said ligand component is in a substantially pure form as a product of peptide synthesis.

11. An isolated polynucleotide having a nucleotide sequence encoding an amino acid sequence of SEQ ID NO: 15, or a complement thereof.

12. An isolated polypeptide having an amino acid sequence of SEQ ID NO: 15.

13. A vector consisting of a polynucleotide encoding a polypeptide having an amino acid sequence of SEQ ID NO: 15.

14. A recombinant host cell comprising a vector comprising a polynucleotide encoding a polypeptide having an amino acid sequence of SEQ ID NO: 15.

15. A process of producing a relaxin3 from a recombinant cell, comprising:

(a) constructing a DNA molecule encoding a relaxin3 propeptide modified by insertion of a peptide linkage forming a protease cleavage site at at least one location selected from the peptide junction between chains A and C and the peptide junction between chains C and B of the relaxin3 propeptide;

(b) constructing a first vector expressing the modified relaxin3 propeptide;

(c) constructing a second vector expressing a protease for cleaving the modified relaxin3 propeptide at the inserted protease cleavage site;

(d) introducing both the first vector and the second vector into a host cell; and

(e) growing the host cell so that both the modified relaxin3 propeptide and the protease are expressed, whereby the protease efficiently cleaves the peptide linkage at said location on the modified relaxin3 propeptide.

16. The process of claim 15, wherein said modified relaxin3 propeptide has a pro-hormone convertase inserted at said at least one location.

17. The process of claim 15, wherein said modified relaxin3 propeptide has furin inserted at the peptide junction between chains A and C of the relaxin3 propeptide.

18. A method of identifying a compound that increases or decreases a biological activity of a GPCR135/relaxin3 complex, comprising the steps of:

(a) contacting a test sample comprising a compound and a buffering solution with an assay reagent comprising a receptor-ligand complex as defined in claim 1;

(b) determining the biological activity of the receptor-ligand complex; and

(c) comparing the result determined in step (b) with a control measurement wherein the receptor-ligand complex has been contacted with the buffering solution.

19. The method of claim 18, wherein the GPCR135 component of the receptor-ligand complex is a product of

expression on the cell surface of a recombinant GPCR135 host cell.

20. The method of claim 19, wherein said determining the biological activity of the receptor-ligand complex comprises measuring a second messenger response.

21. The method of claim 20, wherein said second messenger response is measured by intracellular pH, intracellular calcium ion concentration, or intracellular cAMP concentration.

22. The method of claim 19, wherein the assay reagent comprises an isolated membrane preparation containing the GPCR135 or an active fragment thereof.

23. The method of claim 22, wherein said determining the biological activity of the receptor-ligand complex comprises measuring the amount of protein phosphorylation of the isolated membrane preparation.

24. The method of claim 23, wherein the amount of protein phosphorylation of the isolated membrane preparation is measured using a γ -phosphate labeled GTP molecule.

25. The method of claim 24, wherein the γ -phosphate labeled GTP molecule is selected from ^{35}S -GTP γ S, ^{33}P -GTP γ P, and ^{32}P -GTP γ P.

26. A method of identifying a compound that binds to GPCR135 or an active fragment thereof, comprising the steps of:

(a) contacting GPCR135 or an active fragment thereof with a test compound and with a labeled relaxin3 or an active fragment thereof;

(b) determining the amount of the labeled relaxin3 or active fragment thereof that binds to the GPCR135 or active fragment thereof; and

(c) comparing the amount determined in step (b) with a control measurement wherein the GPCR135 or active fragment thereof has been contacted with the labeled relaxin3 or active fragment thereof in the absence of test compound.

27. The method of claim 26, wherein the labeled relaxin3 or active fragment thereof is labeled with ^{125}I .

28. A method for identifying a compound that binds GPCR135 and mimics relaxin3, comprising:

(a) contacting a test compound with an assay reagent comprising GPCR135 or an active fragment thereof;

(b) determining a biological activity of the GPCR135 or active fragment thereof; and

(c) comparing the result determined in step (b) with that of a control measurement wherein the GPCR135 or an active fragment thereof was contacted with relaxin3 or an active fragment thereof in the absence of the test compound.

29. The method of claim 28, wherein the GPCR135 or active fragment thereof is expressed from the surface of a recombinant cell.

30. The method of claim 28, wherein the GPCR135 or active fragment thereof is within an isolated cell membrane preparation.